

INLAND NAVIGATION.

LOW WATER.

On the 3d navigation on the Mississippi River closed at La Crosse, Wis., on account of low water. On the 20th the river reached 7.0 feet on the gauge at Cairo, Ill. Navigation between Saint Louis, Mo., and Cairo was seriously impeded by low water; all New Orleans boats of the Anchor Line were laid up, and but 2 Natchez boats of the same line were running, and they were compelled to transfer freight to barges between Cairo and Saint Louis. Low water caused inconvenience to transfer boats between Cairo and Birds Point, Mo. The morning of the 20th the stage of the water at Memphis, Tenn., was 5.8 feet and falling.

On the 18th the Red River stood at 1.5 foot on the gauge at Shreveport, La., and was navigable only to the smallest steamers. On the 27th at 5 p. m. the river reached 0.2 foot at that point, the lowest stage of the year.

On the 18th the Tennessee River was very low at Chattanooga, Tenn., and navigation was closed to large boats. On the 22d navigation was closed at Florence, Ala., by low water. On the 28th the stage of water at Chattanooga was the lowest of the year, and only light draught, up-river boats were running.

At the close of the month the Iowa River at Amana, Iowa, was lower than noted for several years.

STAGE OF WATER IN RIVERS.

In the following table are shown the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, September, 1891 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	1	5.5	27	0.4	5.1
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	1	2.9	30	0.9	2.0
Little Rock, Ark.	23.0	1	4.4	30	3.0	1.4
<i>Missouri River.</i>						
Fort Buford, N. Dak.		1	7.3	30	5.3	2.0
Pierre, S. Dak.	14.0	1	1.6	29, 30	0.2	1.4
Sioux City, Iowa.	18.7	1	7.1	25	4.2	2.9
Omaha, Nebr.	18.0	1, 2	8.1	27, 28, 30	6.4	1.7
Kansas City, Mo.	21.0	1	9.0	30	6.1	2.9
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.0	29, 30	1.6	21	1.1	0.5
La Crosse, Wis.	13.0	1, 2	2.0	25-30	1.5	0.5
Dubuque, Iowa.	16.0	1, 3, 4	1.6	24-30	1.0	0.6
Davenport, Iowa.	15.0	3, 4	0.6	25-29	0.1	0.5
Keokuk, Iowa.	14.0	1, 2	0.3	27, 28	—0.5	0.8
Saint Louis, Mo.	30.0	1	10.1	30	4.6	5.5
Cairo, Ill.	40.0	4, 5	14.8	30	3.9	10.9
Memphis, Tenn.	33.0	1	11.9	30	3.5	8.4
Vicksburg, Miss.	41.0	1	17.5	30	3.8	13.7
New Orleans, La.	13.0	13	5.6	20	3.6	2.0
<i>Ohio River.</i>						
Parkersburg, W. Va.	38.0	1	7.3	30	2.2	5.1
Cincinnati, Ohio.	45.0	1	17.8	30	5.5	12.3
Louisville, Ky.	24.0	1	8.8	30	3.4	5.4
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	1	5.3	30	0.6	4.7
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	9	5.8	29, 30	1.9	3.9
<i>Monongahela River.</i>						
Pittsburg, Pa.	29.0	7	7.6	2	2.9	4.7
<i>Savannah River.</i>						
Augusta, Ga.	32.0	6	13.2	27	5.7	7.5
<i>Willamette River.</i>						
Portland, Oregon.	15.0	22	3.7	27, 28	0.6	3.1
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0	1, 8	4.8	28, 29, 30	1.9	2.9
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	9, 13	3.2	27, 28, 30	0.6	2.6

ATMOSPHERIC ELECTRICITY.

AURORAS.

The more widely extended auroral displays reported were observed from New England to Minnesota on the 1st; from New England to Montana and southward to Maryland and southern Ohio on the 9th; in New England, New York, and Pennsylvania, the upper lake region, west Montana, and Washington on the 10th; and from the Atlantic to the Pacific coasts and southward in the central valleys to the 40th parallel on the 11th.

Auroras were reported as follows: 1st, New England, New York, Michigan, and Minnesota. 2d, New England, New York, Wisconsin, and Minnesota. 3d, New England, Illinois, Wisconsin, Iowa, Minnesota, and the Dakotas. 4th, New England and Michigan. 5th, Michigan and the Dakotas. 7th, New England, New York, and Michigan. 8th, New England, New York, Pennsylvania, New Jersey, Michigan, Wisconsin, Iowa, Minnesota, and Montana. 9th, New England, New York, Pennsylvania, New Jersey, Maryland, Ohio, Illinois, Michigan, Wisconsin, Iowa, the Dakotas, Nebraska, Wyoming, and Montana. 10th, New England, New York, Pennsylvania, Michigan, Wisconsin, Iowa, Minnesota, the Dakotas, and Washington. 11th, New England, New York, Pennsylvania, Ohio, Michigan, Illinois, Iowa, the Dakotas, Colorado, Wyoming, Montana, and Washington. 12th, New York, Michigan, Wisconsin, and Montana. 13th, New England. 17th, Ohio and Iowa. 18th, Ohio. 19th, Pennsylvania. 22d, New England. 23d, Wisconsin, Iowa, and Montana. 25th, Iowa. 26th, New England and Minnesota. 27th, New York, Minnesota, Wisconsin, Iowa, and the Dakotas. 28th, New England, New York, Maryland, Ohio, Illinois, Wisconsin, Minnesota, the Dakotas, and Montana. 29th, New England, New York, Michigan, Iowa, the Dakotas, and Montana. 30th, Pennsylvania.

At Sault de Ste. Marie, Mich., an aurora of a grayish tinge

extending from northeast to northwest and to altitude about 25° was observed at 10.15 p. m. of the 1st. Beams of light shot out from the east and west sides to altitude 50°.

On the 9th, at 7.30 p. m., an aurora, consisting of a low arch of diffused whitish light tinged at times with yellow and crimson and resting on a dark segment, was observed at Manchester, N. H. The arch was about 15° in width and extended from about 130° to 220° azimuth, and "merry dancers" shot up to altitude 45° to 50°. The display was most brilliant about 9.30 p. m., and disappeared 11.15 p. m. At Boston, Mass., the aurora was observed at 7.55 p. m., when it extended from northeast to northwest and about 15° above the horizon. Streamers shot upward at intervals, and the display ended at 9.20 p. m. At Concord, Mass., an aurora consisting of 3 distinct arches with long yellow streamers reaching altitude 80° was observed from 8 p. m. until after midnight. At New London, Conn., an aurora consisting of 2 arches with streamers was observed from 9 to 11 p. m. At Oswego, N. Y., an arch of white light extending from northwest to east and to altitude about 15°, with streamers of a greenish and, at times, of a rosy hue, commenced at 7.45 p. m., and continued during the night. At Buffalo, N. Y., a well-defined arch extending about 25° east and west of north, with luminous beams, was observed from 8.30 p. m. until after midnight. At Detroit, Mich., a diffused white light was observed in the northeast at 8 p. m., from which a single streamer about 6° in width rose slowly to the zenith; the display continued about 8 minutes. At Marquette, Mich., a diffused white light, with a greenish tinge, extending from northwest to northeast, was observed at 8.30 p. m., and disappeared at 10.30 p. m. At Medford, Wis., a display consisting of arches and streamers of great brilliancy was observed from 9 to 10 p. m. At Bismarck, N. Dak., an aurora consisting of an arch which extended from 170° to 250° azimuth and to altitude

about 20° was observed at 9.45 p. m. The arch lasted one hour and was followed by streamers of a pale yellow color, with an apparent movement from east to west. The display disappeared about midnight.

On the 10th an aurora consisting of an arch of white light about 3° in width, extending from east to west, and resting on a dark segment, was observed at Marquette, Mich., from 8.25 to 8.55 p. m., with a few beams of pale white light.

At Buffalo, N. Y., the most brilliant aurora observed in years was noted on the 11th. The display appeared as a well-defined arch about 5° in width extending about 60° east and west of north at 8.50 p. m. At 10.48 p. m. a second arch appeared. The display ended 11.45 p. m. At Alpena, Mich., a fan-shaped aurora, with the point resting on the horizon, and a lateral movement from west to east, was observed from 10.15 to 11.55 p. m. At Bismarck, N. Dak., an aurora consisting of an irregular display of streamers in the north commenced at 9 p. m. At 10 p. m. what appeared to be an immense ball of fire was observed in the northwest quadrant, where it remained 15 minutes with very brilliant streamers having an apparent motion from east to west. The display disappeared 11.30 p. m. At Rapid City, S. Dak., an aurora was first observed at 10.30 p. m. At 11.05 p. m. an arch resting on a dark base extended from 135° to 215° azimuth and about half way to the zenith, with a few small beams of light. The display continued until the morning of the 12th.

THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky

Mountains they were reported in the greatest number of states, 22, on the 28th; in 15 to 20 on the 1st to 3d, 5th, 13th to 15th, 17th to 19th, 27th, and 29th; in 10 to 14 on the 6th, 8th, 11th, 12th, 16th, 20th, 24th, and 26th; in 5 to 9 on the 4th, 7th, 9th, 10th, 21st to 23d, 25th, and 30th. There was no date for which thunderstorms were reported east of the Rocky Mountains in less than 5 states.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 29, in Florida; on 22 in Texas; on 15 to 20 in Iowa, Kansas, Louisiana, Michigan, Nebraska, New York, and South Dakota; on 10 to 14 in Illinois, Minnesota, Missouri, New Jersey, North Carolina, North Dakota, Ohio, Pennsylvania, and Wisconsin; on 5 to 9 in Arkansas, Connecticut, Kentucky, Maine, Maryland, Massachusetts, Mississippi, South Carolina, Tennessee, Vermont, and Virginia; and on 1 to 4 in Alabama, District of Columbia, Georgia, Indiana, Montana, New Hampshire, Oklahoma Territory, Rhode Island, and West Virginia. In Delaware and Indian Territory no thunderstorms were reported.

West of the Rocky Mountains thunderstorms were reported in Arizona on the 2d, 9th, 10th, 16th, 17th, 20th to 24th, and 29th; in California on the 2d to 7th, 13th, 15th, and 21st; in Colorado on the 1st to 7th, 9th to 12th, 14th, 18th, 19th, 21st to 27th, and 30th; in Idaho on the 9th and 27th; in Nevada on the 3d, 5th to 10th, 15th, and 22d; in New Mexico on the 1st, 2d, 6th, 7th, 14th, 18th to 25th, 29th, and 30th; in Oregon on the 2d, 3d, 7th, 12th, 13th, 18th, and 28th to 30th; in Utah on the 1st, 3d, 4th, 6th, 7th, 9th to 11th, 15th, 16th, 18th, and 21st to 25th; in Washington on the 3d, 9th, 13th, 17th to 19th, 21st, 22d, and 28th; and in Wyoming on the 1st, 8th, 10th, 15th, 23d, 24th, and 27th.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Very dry weather prevailed in western New England, parts of Maryland, western Virginia, central Alabama, western Florida, in Mississippi and eastern Louisiana, Tennessee, Arkansas, Missouri, Illinois, eastern Ohio, central and southern Wisconsin, Iowa, South Dakota, Nebraska, eastern Kansas, and central New Mexico. In New England a scarcity of water caused the closing of mills, and in a number of the Southern and Western States drought injured crops and caused a suspension of farm work.

Cane, rice, and cotton were injured in Louisiana. Crops of all kinds were damaged and farming operations were almost entirely suspended in Tennessee and Arkansas. Drought

was general in Illinois. In Ohio fall pastureage and the water supply were seriously affected. Streams were low and wells were failing in parts of Iowa.

PRAIRIE AND FOREST FIRES.

On the 17th and 18th extensive prairie fires were reported in parts of North Dakota, and near Rapid City, S. Dak., and on the 27th, in Emmons county, N. Dak., in northern South Dakota, and in Chippewa county, Wis.

On the 24th forest fires were reported in Barron, Polk, Washburn, Wood, Burnett, and Waupaca counties, Wis.; from the 24th to 27th near Osceola Mills, Wis.; and on the 29th in El Dorado county, Cal.

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for September, 1891, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 6.3 below the normal; maximum, 95, at Wiggins, 19th, 22d, and 23d; minimum, 46, at Jasper, 24th; greatest monthly range, 45, at Brewton; least monthly range, 30, at Union Springs, Citronelle, Selma, and Goodwater.

Precipitation.—The average was 0.37 below the normal; greatest monthly, 6.90, at Fort Deposit; least monthly, 0.20, at Chepultepec.

Wind.—Prevailing direction, northeast.—*P. H. Mell, Observer, Weather Bureau, Auburn, director,*

ARKANSAS.

Temperature.—The mean was 0.8 below the normal; maximum, 102, at Lead Hill, 24th; minimum, 40, at Rogers, 4th; greatest monthly range, 57, at Lead Hill; least monthly range, 22, at Winslow.

Precipitation.—The average was 2.50 below the normal; greatest monthly, 5.80, at Texarkana; least monthly, 0.00, at Gaines Landing and Harrisburgh.

Wind.—Prevailing direction, southeast.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Observer, Weather Bureau, assistant.*

COLORADO.

Temperature.—The mean was above the average at all stations, and at points in the Arkansas Valley was the highest on record; the maximum at Cheyenne Wells, 104, 14th, was the highest maximum on record for September; minimum, 21, at Alma, 23d, and at Cumbres, 27th.

Precipitation.—The average was greatest west of the range, and least in the upper Arkansas valley and in the southeastern counties; greatest monthly, 7.32, at Cumbres; least monthly, 0.12, at Byers.—*W. S. Miller, Observer, Weather Bureau, Denver, director.*

ILLINOIS.

Temperature.—The mean was 4.5 above the normal of the last 16 years; maximum, 100, at Pontiac, 23d, at Griggsville, 24th, at Greenville, 24th and 25th, and at Carlinville, 26th; minimum, 37, at Hennepin, 4th.

Precipitation.—The average was 2.07 below the normal; greatest monthly, 2.02, at White Hall; least monthly, 0.15, at Beason.

Wind.—Prevailing direction, southwest.—*John Craig, Observer, Weather Bureau, Springfield, director.*